

Notice of Allowability

Application No.

09/603,575

Examiner

Thomas M. Ho

Applicant(s)

XU ET AL.

Art Unit

2134

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 101/9/05.
2. ☒ The allowed claim(s) is/are 4.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

1. The RCE of 10/19/05 has been received and entered.
2. Claim 4 is pending.

Reasons for Allowance

3. *with regard to claim 4: gm*
Claim 4 recites:

Granger, US patent 6643775 discloses a method for obfuscating computer program instructions upon disassembly, the method comprising:

- Inserting an obfuscating instruction for causing a disassembler to not disassemble one or more bytes subsequent to the obfuscating instruction. (Column 19, lines 5-22)

and

- Inserting a branch instruction to invoke execution of one or more bytes subsequent to the obfuscating instruction, (Column 23, line 62 – Column 24, line 3)

Granger fails to explicitly disclose an embodiment wherein the said obfuscating instruction used is an interrupt.

Operating System Concepts, fifth edition, Silberschatz et al. Figure 12.3 and pages 402-404 discloses inserting an interrupt for causing a currently executing program to not continue its execution of instructions subsequent to the interrupt instruction.

Art Unit: 2134

Operating System Concepts, fifth edition, Silberschatz et al. Figure 12.3 and pages 402-404 discloses inserting a branch instruction to invoke execution of one or more bytes subsequent to the instruction, where the branch instruction is the “return from interrupt” instruction.

Operating System Concepts, fifth edition, Silberschatz et al. teaches that the basic interrupt mechanism enables the CPU to respond asynchronous events.

It would have been obvious to one of ordinary skill in the art at the time of invention to use an interrupt handler to interrupt the obfuscating computer program method of Granger in order to allow the computer to respond to asynchronous events in the meantime.

However, neither Granger nor Operating System Concepts, fifth edition, Silberschatz et al. discloses the method of code obfuscation including the step of inserting the following code:

JMP \$+4;

INT 35h.

JMP \$+4 however is a branch instruction. The Examiner considers jump type instructions to be inherent to branch instructions. The two types of instructions are virtually synonymous with one another. A branch instruction is understood as an instruction

“To relinquish control to another set of instructions or another routine as a result of the presence of a branch.”

The Jump instruction is an instruction understood to mean:

“To move from one set of instructions in a program to another out of sequence.”

(Taken from <http://www.dictionary.com>)

A branch inherently contains a “jump” when it relinquishes control to another routine, even though this may be dependent on a particular condition (conditional branches).

The Examiner notes that each of these instructions were well known in the art at the time of invention. INT 35h is the interrupt to 35h which performs the function of getting the interrupt vector. (“Programmer’s Guide to the IBM PC”, Peter Nortion, 1985, Microsoft Press, pgs, 303, 49, Figure 3-1)

JMP \$+4 is a command to allow program execution to jump 4 bytes from the current point in execution, which is the size of a single word for a 32-bit system.

The Jump command is disclosed in Turbo Assembler, V 2.5, p.292.

Art Unit: 2134

However, while each of these commands has a separate utility, the search of the prior art has not uncovered any art where the code is inserted in consecutive sequence, nor has any motivation been found to combine the two commands for specific use in an obfuscation system, particular why such code would be inserted as a means of providing obfuscation.

It is self evident to programmers in the art, that the mere appearance the code `JMP $+4` and `INT 35h` however may appear in some preexisting code in the prior art. Just as mathematical operators such as an addition operator may take any argument $x + y = z$, so too can assembly operators take any arguments a programmer may see fit to use to whatever task he or she may be endeavoring to accomplish.

For this reason, the Examiner previously rendered a similar rejection based on claims 10 and 11 in which the insertion was not made. (See the final rejection of 4/21/05)

The claim distinguishes from the type of subject matter previously claimed in claims 10 and 11 in that it recites the insertion of these instructions as a means of providing code obfuscation, which has an established utility in the art. Additionally, this code is inserted specifically to cause a disassembler not to disassemble one or more bytes. Neither motivation to combine, nor any prior art disclosure has been found which teaches the combination of elements of claim 4. Accordingly, the claim is held to be allowable.

Conclusion

4. Any inquiry concerning this communication from the examiner should be directed to Thomas M Ho whose telephone number is (571)272-3835. The examiner can normally be reached on M-F from 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory A. Morse can be reached on (571)272-3838.

The Examiner may also be reached through email through Thomas.Ho6@uspto.gov

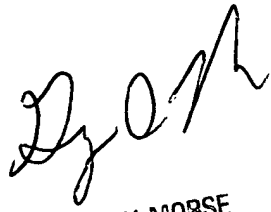
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-2100.

General Information/Receptionist Telephone: 571-272-2100 Fax: 571-273-8300

Customer Service Representative Telephone: 571-272-2100 Fax: 571-273-8300

TMH

November 14th, 2005


GREGORY MORSE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100